

Helmet-mounted Imaging System

Company:

Zybron, Inc.

Location:

Beavercreek, Ohio

Employees:

15

President:

Evan Zhang, Ph.D.

Project Officer:

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Ohio



Air Force Requirements:

The Air Force sought a new helmet-mounted, Long Wavelength Infrared (LWIR) imaging system to help military members more clearly locate a person and other objects through dense smoke or dust—conditions typically encountered during fires or in wartime action. The system would also relay accurate target imagery to commanders who then could send video and audio to their troops.

SBIR Technology:

Using Small Business Innovation Research Program (SBIR) Phase I and II contracts, Zybron, Inc. developed an infrared (IR) imaging system that can detect and display minute temperature differences of 0.07° C in different areas of a target or between different targets such as combustion, furniture, and human beings. Warfighters will be able to search a dust and smoke filled battlefield with "hands-free" technology. Military firefighters will be able to find and remove unconscious victims from smoke-filled rooms in as little as two minutes, saving precious time and giving the victims a second chance at life. Firefighters usually carry heavy backpacks to help them breathe in smoky areas, and wear masks and thick protective clothing against the heat. The new sensor system weighs only two pounds including battery. It can be worn totally self-contained on top of the firefighter's helmet without obscuring vision. The system features high-quality wireless video and audio link between the frontlines and the rear; voice activated, hands free switching; and automatic target recognition. The voice transmission is

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from a thin film pressed against the user's forehead, not from a microphone near the user's mouth. Therefore, military forces and firefighters wearing masks are able to talk clearly with others through wireless communication because the large environmental noise cannot get into the thin film.

In the future Air Force pilots may use the helmet-mounted system to locate enemy aircraft—even stealthy models—and ground targets by day or night, in all kinds of weather, and take defensive or offensive action. Also, Zybron's new helmet does not have parallax or dead angle between the IR camera and the viewer, thus it will be an ideal tool to help medical doctors perform surgery in the battlefield without any light.

Company Impact:

The Zybron, Inc. technology has already generated military and commercial contracts valued at \$1.5 million dollars. The company anticipates many military and commercial applications for the system including the U.S. Army and Marines, the U.S. border patrols, the U.S. Special Forces operations, and U.S. security guards.

It also sees applications in industry, agriculture, medicine, construction, and fine arts. Examples of possible commercial use are A) in the production of better-quality steel, using the IR imager to monitor temperature controls during manufacturing; B) in paper mills, to check moisture content of products for continuous quality control; C) in power plants, to locate short circuits in remote wires and low oil level in remote transformers; D) for window manufacturers, to check thermal insulation of homes; and E) for medical diagnosis to detect vascular disease and monitor open heart surgery.

Company Quote:

"The SBIR program made it possible for a small company to perform high risk research. Without SBIR funding this would have been impossible. The SBIR contracts allowed us to do a thorough job of research and development of the innovative prototype system. They also brought us together with AFRL scientists and engineers, which proved to be an invaluable resource. The positive research results give us a chance to bring new investment into the company for further system development and production."

Dr. Evan Zhang, President
Zybron, Inc.

SBIR

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